

Notice of Allowability

Application No.

09/965,373

Examiner

Wai-Sing Louie

Applicant(s)

CHUNG ET AL.

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 7/19/2004.
2. ☒ The allowed claim(s) is/are 7,11,12,14,19,20,22,27,28,31,34,37,39,40,42-46,48,49 and 52-61.
3. ☒ The drawings filed on 26 September 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 7/31/03, 5/6/02
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance:

The claimed invention is a system for processing a substrate, comprising:

- at least one atomic layer deposition barrier chamber for depositing a barrier layer comprising tantalum nitride, where the at least one atomic layer deposition barrier chamber comprises a first source providing PDMAT and a second source providing ammonia; and
- at least one physical vapor deposition metal seed chamber for depositing a copper alloy seed layer over the barrier layer, where the copper alloy seed layer comprises copper and a metal selected from the group consisting of aluminum, magnesium, titanium, zirconium, tin, and combinations thereof and where the metal is present in the copper alloy in a concentration between about 0.01 atomic percent and about 2.0 atomic percent.

The prior art of record does not disclose or suggest either in singly or in combination the following limitations and other elements in the claims:

- Reference Cohen (US 6,610,151) does not disclose a barrier layer deposited in a atomic layer deposition chamber, where the atomic layer deposition barrier chamber comprises a first source providing PDMAT and a second source

providing ammonia; and the metal is present in the copper alloy in a concentration between about 0.01 atomic percent and about 2.0 atomic percent.

- Reference Kang et al. (US 6,139,700) do not disclose the source gases comprise a first source providing PDMAT and a second source providing ammonia; and the metal is present in the copper alloy in a concentration between about 0.01 atomic percent and about 2.0 atomic percent.

Therefore, the above references do not disclose the claimed invention of present application and claims 7, 11-12, 14, 19-20, 22, 27-28, 31, 34, 37, 39-40, 42-46, 48-49, and 52-61 are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (571) 272-1709. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ws1
October 5, 2004.



LONG PHAM
PRIMARY EXAMINER